

**Notice of Allowability**

Application No.

09/990,274

Applicant(s)

HSIAO, CHUN-YANG

Examiner

David S. Kim

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12 May 2005.
2. ☒ The allowed claim(s) is/are 1, 3 and 4 (renumbered as claims 1-3).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

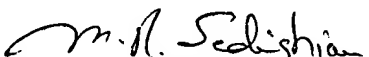
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**M. R. SEDIGHIAN**  
**PRIMARY EXAMINER**

Art Unit: 2633

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. David Klein, Esq. on Wednesday, November 2, 2005. The application has been amended as follows:

#### *In the claims*

Claim 1 (strikethrough portions are deletions, underlined portions are additions).

An integrated circuit receiver available for infrared or ultrasonic transmission with digital filtering comprising:

an infrared receiver or ultrasonic transducer for receiving a transmitted signal from outside of said integrated circuit receiver and producing a modulated carrier signal at an output thereof;

an amplifier having an input connected to said output of said infrared receiver or ultrasonic transducer for amplifying said modulated carrier signal to provide an amplified signal at an output of said amplifier; and

a digital filter having an input connected to said output of said amplifier for filtering out a carrier component from said amplified signal to recover an original digital data signal,

said digital filter having a sampling frequency with a period greater than a period of a frequency of said carrier component, wherein said digital filter includes:

a fixed-interval reset circuit having an input connected to said output of said amplifier for receiving said amplified signal and providing a fetched signal responsive thereto, said fixed-interval reset circuit having a reset period greater than said period of said frequency of said carrier component; and

a fixed-interval sample circuit having an input connected to an output of said fixed-interval reset circuit for receiving said fetched signal and outputting said original digital data signal responsive thereto, said fixed-interval sample circuit having a sampling period equal to said reset period of said fixed-interval reset circuit.

Art Unit: 2633

Claim 2 (cancelled).

Claim 3 (renumbered as claim 2, strikethrough portions are deletions, underlined portions are additions).

An integrated circuit receiver according to claim ~~2~~ 1, wherein said fixed-interval reset circuit and fixed-interval sample circuit are constructed with D type flip-flops.

Claim 4 (renumbered as claim 3, strikethrough portions are deletions, underlined portions are additions).

An integrated circuit receiver according to claim ~~2~~ 1, wherein said fixed-interval reset circuit and fixed-interval sample circuit are triggered on a rising edge and falling edge of a clock, respectively.

***In the specification***

On page 1, line 25, replace “photodiode receiver front-end is amplified” with -- photodiode receiver front-end is amplified --.

On page 2, lines 6-7, replace “directly output the original or unmodulated signal” with -- directly output a digital data signal --.

On page 2, line 21 – page 3, line 2, notice the following corrections (strikethrough portions are deletions, underlined portions are additions):

However, ~~with the advent of the technology~~ digital filtering is has been developed to demodulate signals, for instance, by the Taiwan patent application no. 83213974 entitled “Improved Infrared Receiver” issued to Cheng. Cheng proposed an apparatus to do signal filtering by a digital filter to avoid the distortion and error ~~resulted~~ resulting from the filtering process, thereby increasing the signal reliability and accuracy.

Art Unit: 2633

On page 3, line 23, replace "outputs a modulated or carrier signal" with -- outputs a modulated carrier signal --.

On page 4, line 1, replace "recover the original or unmodulated signal" with -- recover a digital data signal --.

Further amend the amended specification (filed on 12 May 2005). Note the following corrections to the amended paragraph on page 2 of the response filed on 12 May 2005 (strikethrough portions are deletions, underlined portions are additions):

The block diagram of an embodiment according to the present invention is shown in FIG. 3, in which an infrared receiver 10 or ultrasonic transducer 22 accepts a transmitted signal from outside and outputs a modulated ~~or~~ carrier signal. The output from the infrared receiver 10 or ultrasonic transducer 22 is fed to an amplifier circuit 24, and the amplified signal thus produced by the amplifier circuit 24 is further fed to a digital filter 26 to filter out the carrier component thereof and therefore ~~the original or unmodulated~~ a digital data signal is recovered. When no transmitted signals outside are present, the output of the amplifier circuit 24 remains at a silent voltage.

On page 6, line 6, replace "second D flip-flop 343" with -- second D flip-flop 34 --.

On page 6, line 7, replace "The unmodulated signal" with -- The demodulated signal --.

Further amend the amended specification (filed on 12 May 2005). Note the following corrections to the amended paragraph on page 3 of the response filed on 12 May 2005 (strikethrough portions are deletions, underlined portions are additions):

FIG. 5 shows the block diagram of a digital filter, in which the digital filter 26 is fed with the amplified output signal that is amplified by the amplifier 28 with the output signal from the infrared receiver 10 or ultrasonic transducer 22. When the amplified output signal is inputted to the digital filter 26, the output of the fixed-interval reset circuit 38 within the digital filter 26 is set ON. The clock 44 is connected to a fixed-interval reset circuit 38 and is connected to a fixed-interval sample circuit 40

Art Unit: 2633

through an inverter 42. The fixed-interval reset circuit 38 resets its output to OFF every interval  $t$ . In the detection of an infrared or ultrasonic signal, by setting the reset period  $t$  of the fixed-interval reset circuit 38 to be greater than the period of the carrier signal for the infrared or ultrasonic transmission, the ~~unmodulated or original~~ a data signal will be output by the fixed-interval sample circuit 40 and the influence of the duty cycle is avoided. Thus, ~~the unmodulated or original~~ the data signal is recovered and demodulation is achieved.

On page 7, line 14, replace "is trigger on" with -- is triggered on --.

On page 7, lines 20-24, notice the following corrections (strikethrough portions are deletions, underlined portions are additions):

This In this manner, the disclosed apparatus filters out the carrier component by use of digital filtering, ~~and detects~~ The apparatus filters the infrared or ultrasonic carrier signal by fixed-interval sampling ~~to achieve filtering~~. Furthermore, since no analog filter is needed, it is suitable to be integrated within a chip.

***In the abstract*** (strikethrough portions are deletions, underlined portions are additions)

The present invention discloses an integrated circuit receiver available for infrared or ultrasonic transmission by use of digital filtering for demodulation of infrared or ultrasonic carrier signal. The integrated circuit receiver comprises an infrared receiver or ultrasonic transducer to receive the transmitted signal from outside and output ~~the a~~ modulated carrier signal. The modulated ~~or~~ carrier signal is fed to an amplifier circuit to be amplified and then outputted to a digital filter to filter out the carrier from the amplified signal, and thus ~~the original or unmodulated~~ a digital data signal is recovered. The filtering thereof is done by a digital filter instead of an analog one, ~~therefore there is no need for discrete devices such as capacitors, resistors, diodes and inductor, and it is suitable to be integrated within a chip as an apparatus to receive and detect infrared and ultrasonic signals.~~

Art Unit: 2633

***In the drawings***

2. The following changes to the drawings have been approved by the examiner and agreed upon by applicant:

In Fig. 3, switch the positions of reference characters "10" and "22".

In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

Additionally, in Fig. 4, it appears that clear port CL 321 is missing an inverting circle as shown for clear port CL 341. Without this inverting circle, the clock diagram in Fig. 6 appears incorrect.

3. The following is an examiner's statement of reasons for allowance:

Applicant's most recent amendment filed on 12 May 2005 introduced the following new limitation to independent claim 1:

said digital filter having a sampling frequency with a period greater than a period of a frequency of said carrier component.

This limitation is known in the art. Some known processes that include this limitation include decimation, under-sampling, sub-sampling, and aliasing. For example, U.S. Patent No. 6,061,551 to Sorrells et al. discloses the beneficial application of aliasing to EM signals, which include infrared signals (e.g., Fig. 12C, Fig. 14C, Figs. 15A-E, Fig. 18A-E, Figs. 33A-D, Fig. 36A-E, Figs. 56A-D, Figs. 58A-F). Accordingly, in view of Sorrells et al., this new limitation does not appear to make independent claim 1 patentable.

However, the limitations (the details of the fixed-interval reset circuit and the details of the fixed-interval sample circuit) disclosed in former claim 2 (now presently cancelled) are not disclosed by the prior art of record, and an additional search did not reveal further references that cast doubt on the patentability of the invention disclosed in former claim 2 (now presently cancelled). Accordingly, these limitations are now combined with former independent claim 1 to make present claim 1 (as shown above) allowable.

Art Unit: 2633

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

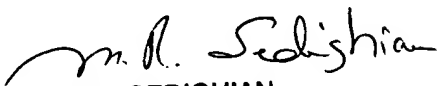
4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gerwen et al. is cited to show another apparatus that employs a sampling frequency with a period greater than a period of a frequency of a carrier component (Figs. 3 and 5).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DSK

  
**M. R. SEDIGHIAN**  
**PRIMARY EXAMINER**